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AN EVALUATION OF THE PHONOVISUAL METHOD, GRADES 1-3.
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THE ACHIEVEMENT TEST PERFORMANCES OF TWO GROUPS OF CHILDREN FOR GRADES 1, 2, AND 3 IN TWO PASADENA, CALIFORNIA, SCHOOLS WERE COMPARED TO EVALUATE THE EFFECTIVENESS OF A 3-YEAR EXPERIMENTAL PROGRAM USING THE PHONOVISUAL METHOD OF READING INSTRUCTION. PUPILS WERE MATCHED ON SEX, IQ, AND CHRONOLOGICAL AGE. DIFFERENCES OBSERVED BETWEEN THE MEAN SCORES OF GROUPS AT EACH GRADE LEVEL AND FOR EACH SEX WITHIN THE RESPECTIVE GROUPS ON ACHIEVEMENT TESTS IN READING VOCABULARY, READING COMPREHENSION, AND SPELLING WERE ANALYZED. CORRELATION ANALYSES WERE MADE BETWEEN THE SCORES OBTAINED IN SEPTEMBER BY THE FIRST-GRADE CHILDREN ON A MEASURE OF LEARNING READINESS AND END-OF-YEAR READING TEST SCORES. CHILDREN IN THE EXPERIMENTAL SCHOOL WERE FOUND TO BE SUPERIOR TO THEIR COUNTERPARTS IN THE CONTROL SCHOOL IN EACH ANALYSIS OF TEST PERFORMANCE. ALTHOUGH THE GIRLS' PERFORMANCE WAS GENERALLY SUPERIOR TO THE BOYS', BOYS EXPOSED TO THE PHONOVISUAL METHOD WERE AIDED SUBSTANTIALLY IN ACHIEVING HIGHER LEVELS OF PROFICIENCY IN READING SKILLS. A DETAILED ANALYSIS OF DATA IS INCLUDED IN THE REPORT. (LS)

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An Evaluation of the Phonovisual Method

Grades 1-3

Evaluation Report
Number Seven

RE 000 119

Pasadena City Schools

Pasadena, California

1966

PASADENA CITY SCHOOLS

EVALUATION REPORT

NUMBER SEVEN

An Evaluation of the Phonovisual Method Grades 1-3

Department of Research
Pasadena City Schools
Pasadena, California
September 1965

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The additional materials used to supplement the basic reading program were the Phonovisual Method, the Phonovisual Diagnostic Consonant Charts, the Phonovisual Diagnostic Vowel Charts and the Phonovisual Skill Builders.[1]

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Joseph T. Hanson
Administrative Director for Research

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[1]Schoolfield, Lucille D., and Timberlake, Josephine B., The Phonovisual Method (and the related materials mentioned). Washington, D.C. 20016 (4708 Wisconsin Ave., N.W.): Phonovisual Products, Inc., 1962.

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PASADENA CITY SCHOOLS
Department of Research
September 1965

Final Evaluation of the Phonovisual Method
Grades 1-3

Part I - Differences Between Experimental and Control Groups

In September 1964, the Department of Research provided a preliminary evaluation report of the Phonovisual method of reading instruction which had been used in one of Pasadena's elementary schools since the 1962-63 school year.[1] The protocol of the Phonovisual Pilot Project called for a final evaluation study after the third year of experimentation — the 1964-65 school year. Thus, this report on the effectiveness of the Phonovisual materials and method, as determined by the use of standardized tests, includes an analysis of performance by children who had been exposed to the Phonovisual method for nearly three years.

The following paragraph is quoted from the preliminary evaluation report:

"The research design for evaluation of the pilot project included a Control school. In the selection of the Control school, two basic requirements were followed: (1) the school selected should be in the same general geographic area of the Pasadena Unified School District, and (2) the school should have sufficient enrollment in the primary grades to provide an adequate sample at each grade level for 'matching' pupils with respect to intelligence or scholastic ability and chronological age. It was assumed that teaching ability was comparable at Experimental and Control schools."

Since some research has reported significant differences between boys and girls in reading test performance, pupils in the 1964-65 Experimental and Control schools were also matched or paired according to sex with an equal number

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[1] Preliminary Evaluation of the Phonovisual Method, Kindergarten and Grades 1-3, PASADENA CITY SCHOOLS EVALUATION REPORT NUMBER TWO, September 1964.

of boys and girls included in the sample of each school at each grade level. The pairing of each child with respect to sex, scholastic ability, and age resulted, therefore, in two equivalent groups of children in each grade, only one of which was given reading instruction by the Phonovisual method.

Grade 1

Sixty first-grade children of the Experimental school were paired child for child with 60 pupils in grade one of the Control school according to sex, chronological age, and Total Readiness Score of the Metropolitan Readiness Tests. For matching purposes, children were considered of the same age if within ± 3 months and as having "equal" learning readiness or scholastic ability if Total Readiness Scores were identical or did not differ more than the Standard Error of Measurement of the test. It may be observed in Table I that the means and standard deviations of the Experimental and Control groups are very similar in chronological age and in readiness score, showing the original pairing to have been satisfactory.

The significant differences in performance between the 1964-65 Experimental and Control groups on the California Reading Test, which may be observed in Table I, are of approximately the same magnitude as those reported earlier for the 1963-64 first-grade groups.[2] The 1964-65 Experimental group's mean performance on the Reading Vocabulary section exceeded the Control group's mean performance by 10.20 raw score points. The probability that the obtained difference could be due to chance or sampling fluctuations is less than one in one hundred ($<.01$).

On the Reading Comprehension section, the Experimental group's mean score exceeded that of the Control group by 2.87, a very significant difference ($<.01$).

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[2]Ibid

TABLE I

Performance of Grade I Experimental and Control Groups
on California Reading Tests

Grade 1	Experimental	Control
No. of children	60	60
Mean CA (months)	83.73	83.67
S.D. of CA's (months)	3.49	3.41
Mean Readiness Score	81.36	81.57
S.D. of Readiness Scores	9.18	8.99
VOCABULARY		
Mean Score	61.93	51.73
S.D.	10.13	11.57
$S.E._M$	1.32	1.51
$M_E - M_C$	10.20	
S.E. Diff.	1.51	
t	6.75	
P	<.01	
COMPREHENSION		
Mean Score	7.97	5.10
S.D.	4.22	3.92
$S.E._M$	.55	.51
$M_E - M_C$	2.87	
S.E. Diff.	.62	
t	4.63	
P	<.01	

Further statistical evidence demonstrating the effectiveness of the Phonovisual materials and method of instruction at the first-grade level is found in a correlational analysis of scores on the Metropolitan Readiness Tests (Total Score) and the California Reading Test scores. The following Pearson product-moment coefficients of correlation were obtained for the Experimental and Control groups:

	Metropolitan Readiness Test vs. California Reading Test	
Group	Vocabulary	Comprehension
Experimental	.61	.62
Control	.51	.39

It will be noted that the correlation coefficients for the Experimental group are of greater magnitude than those based on the test scores of children in the Control group. The coefficients indicate also a high degree of relationship between the September scores of the Experimental-group children on the Metropolitan Readiness Tests and their performance near the end of the first grade on the California Reading Vocabulary and Comprehension Tests. When the Metropolitan Readiness Tests data in Table I are taken into consideration, the coefficients are of exceptional magnitude. The standard deviations shown in Table I indicate that the children in the Phonovisual Pilot Project were relatively more homogeneous than the first-grade pupils included in the normative population for the Metropolitan test, which had a standard deviation of 13.92. When the above correlation coefficients were submitted to the formula for restriction of range,[3]

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[3] J.P. Guilford. Fundamental Statistics in Psychology and Education. New York: McGraw-Hill Book Company, Inc., 1950, p. 348ff

the corrected coefficients below were derived:

	Metropolitan Readiness Test vs. California Reading Test	
Group	Vocabulary	Comprehension
Experimental	.76	.77
Control	.68	.55

The high relationship usually found between scores attained on the Metropolitan Readiness Tests and subsequent performance on reading achievement tests is reaffirmed by the data in this study.

The effectiveness of the Phonovisual method in assisting young children to reach their learning potential is perhaps most easily seen by use of bivariate charts (Tables II and III). Table II shows the first-grade "success" in Reading Vocabulary of the Experimental and Control pupils in each September readiness category. The Readiness Status categories, E through A, correspond successively to Total Score ranges of the Metropolitan Readiness Tests, representing successively 7%, 24%, 38%, 24% and 7% of the distribution of scores for the national standardization group. Similarly, the Reading Vocabulary achievement levels for this study were established on raw score ranges of the California Reading Test.

It is interesting to note that of those Experimental group pupils who were in the A, "Superior", Readiness Status category in September, 85% reached the highest achievement level, A, in Reading Vocabulary near the end of the first grade. In contrast, only 4 pupils or 29% of the Control group in the same September readiness category achieved Level A in May.

TABLE II

Distribution of May Reading Vocabulary Levels
for Pupils in Each September Readiness Category

Experimental

Readiness Status in September of First Grade	Reading Vocabulary Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior							2	(15)	11	(85)	13
B High Normal			1	(4)	1	(4)	10	(43)	11	(48)	23
C Average	1	(5)	2	(9)	9	(41)	7	(32)	3	(14)	22
D Low Normal			1	(50)	1	(50)					2
E Poor Risk											
Total	1	(2)	4	(7)	11	(18)	19	(32)	25	(42)	60

Control

Readiness Status in September of First Grade	Reading Vocabulary Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior			1	(7)	4	(29)	5	(36)	4	(29)	14
B High Normal	3	(12)	3	(12)	9	(35)	7	(27)	4	(15)	26
C Average	4	(22)	6	(33)	5	(28)	3	(17)			18
D Low Normal	1	(50)	1	(50)							2
E Poor Risk											
Total	8	(13)	11	(18)	18	(30)	15	(25)	8	(13)	60

Note: The sum of the per cents in any row may exceed or may be less than 100 because of rounding in individual cells.

Of the 23 Experimental group children who were in the B, "High Normal", readiness classification, 21 or 91% performed at Level B or higher in Reading Vocabulary after instruction in grade one. Children in the Control group who were similarly classified with regard to readiness for learning were not nearly so successful in reaching their potential, only 42% achieving at Level B or higher in the spring of 1965. Twenty-four per cent of the relatively high-ability (B) Control pupils performed below Level C on the Reading Vocabulary test.

Eighty-seven per cent of the pupils in the Experimental group with "Average" readiness scores showed proficiency in Reading Vocabulary of average (Level C) or better, while only 45% of their counterparts in the Control group achieved such proficiency.

It should be noted that none of the 60 pupils in either group, Experimental or Control, selected for inclusion this study were in the "Poor Risk" readiness category.

Similar information to that gained from Table II can be determined from Table III, showing the relation between September Readiness Status and end-of-grade achievement in Reading Comprehension for both groups of first-grade children in the Phonovisual Pilot Reading Project. It is apparent that a significantly higher percentage of the Experimental-group pupils than of the Control-group pupils reached learning potential as determined by the Total Score on the Metropolitan Readiness Tests.

Grade 2

It was possible to pair 68 second-grade children in the Experimental school with 68 second-grade children in the Control school with respect to sex, scholastic ability (I.Q.) and chronological age. Descriptive data for the resulting equivalent groups are provided in Table IV, along with

TABLE III

Distribution of May Reading Comprehension Levels
for Pupils in Each September Readiness Category

Experimental

Readiness Status in September of First Grade	Reading Comprehension Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior					2	(15)	1	(8)	10	(77)	13
B High Normal			3	(13)	4	(17)	6	(26)	10	(43)	23
C Average	1	(5)	8	(36)	8	(36)	3	(14)	2	(9)	22
D Low Normal	1	(50)	1	(50)							2
E Poor Risk											
Total	2	(3)	12	(20)	14	(23)	10	(17)	22	(37)	60

Control

Readiness Status in September of First Grade	Reading Comprehension Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior	1	(7)	7	(50)			1	(7)	5	(36)	14
B High Normal	1	(4)	9	(35)	11	(42)	2	(8)	3	(12)	26
C Average	5	(28)	10	(56)	1	(6)	1	(6)	1	(6)	18
D Low Normal	1	(50)	1	(50)							2
E Poor Risk											
Total	8	(13)	27	(45)	12	(20)	4	(7)	9	(15)	60

Note: The sum of the per cents in any row may exceed or may be less than 100 because of rounding in individual cells.

performance data on the Reading Vocabulary, Reading Comprehension and Spelling sections of the California Achievement Tests, Upper Primary Battery.

The data in Table IV indicate that the Reading Vocabulary and Reading Comprehension test performance of the second-grade Experimental group exceeded that of the Control group. The difference was significant in each instance with the probability of each difference between mean scores (3.21 and 4.50 raw score points, respectively) being due to chance beyond the .01 level.

Since it was hypothesized that the Phonovisual method might also aid or contribute to the spelling performance of primary grade pupils, a measure of spelling achievement was included in the end-of-year testing program for the second-grade Experimental and Control groups. In Table IV, it will be seen that the mean score of the Experimental group exceeded that of the Control group by 2.03 raw score points, a difference significant beyond the .01 level.

The superiority of the second-grade Experimental group over the Control group in Reading Vocabulary and Reading Comprehension in 1963-64 (as shown in the preliminary evaluation report) and again in 1964-65 is noteworthy. No measure of spelling performance was administered to the second-grade Phonovisual Pilot Reading Project pupils in 1963-64.

Grade 3

The equivalent 1964-65 Experimental and Control groups in Grade 3 consisted of 108 pupils, i.e., 54 pupils in the Experimental school were paired or matched with 54 Control school pupils on sex, I.Q. and chronological age.

Experience with the Upper Primary Battery of the California Achievement Tests, administered to third-grade Phonovisual Pilot Reading

TABLE IV

Performance of Grade II Experimental and Control Groups on the California Reading and Spelling Tests

Grade 2	Experimental		Control
No. of children	68		68
Mean CA (months)	95.19		95.22
S.D. of CA (months)	3.39		2.94
Mean IQ	109.12		109.10
S.D. of IQ's	8.31		7.97
VOCABULARY: Mean Score	37.03		33.82
S.D.	6.23		6.39
$S.E._M$	.76		.78
$M_E - M_C$		3.21	
S.E. Diff.		1.03	
t		3.12	
P		<.01	
COMPREHENSION: Mean Score	36.15		31.65
S.D.	9.12		10.15
$S.E._M$	1.11		1.24
$M_E - M_C$		4.50	
S.E. Diff.		1.60	
t		2.81	
P		<.01	
SPELLING: Mean Score	13.81		11.78
S.D.	4.69		3.41
$S.E._M$	.57		.42
$M_E - M_C$		2.03	
S.E. Diff.		.71	
t		2.86	
P		<.01	

Project pupils in May 1964, suggested that the Reading Vocabulary section did not have an adequate "ceiling" for relatively high-ability groups completing the third grade. Therefore, in an effort to make certain that the achievement tests employed with the 1964-65 Grade 3 groups would have a high enough ceiling (a sufficient number of difficult items) to adequately measure the pupils' range of ability, the Elementary Battery was utilized.

Table V provides the descriptive and performance data relative to the third-grade pupils.

The third-grade Experimental group showed superior performance in Reading Vocabulary with a mean score of 33.80 versus 28.48 for the Control group. The difference between the means (5.32) was very significant — beyond the .01 level. In Reading Comprehension, the Experimental group exceeded the Control group by 6.48 raw score points, also significant beyond the .01 level.

A difference of 2.15 raw score points between the mean scores of the third-grade groups on the Spelling test will be noted in Table V. The obtained difference in mean performance was statistically significant at the .05 level of probability.

The test results of the 1964-65 third-grade pilot project pupils are more definitive than those reported in the preliminary evaluation report for the 1963-64 third-grade groups. It will be remembered that the 1963-64 Experimental group did not use the Phonovisual method until the second semester of the second grade. On the other hand, pupils in the 1964-65 third-grade Experimental group were instructed earlier (in Grade 1) by the Phonovisual method and thus were exposed to the method for a longer period of time. The use of the Elementary Battery of the California Achievement Tests in May 1965, rather than the Upper Primary Battery, may have enhanced the opportunity for the 1964-65 Experimental group to

TABLE V

Performance of Grade III Experimental and Control Groups on the California Reading and Spelling Tests

Grade 3	Experimental		Control
No. of children	54		54
Mean CA (months)	108.11		108.11
S.D. of CA (months)	3.30		3.65
Mean IQ	111.85		111.91
S.D. of IQ's	9.83		9.69
VOCABULARY: Mean Score	33.80		28.48
S.D.	5.42		8.13
$S.E._M$	.74		1.12
$M_E - M_C$		5.32	
S.E. Diff.		1.29	
t		4.12	
P		<.01	
COMPREHENSION: Mean Score	40.59		34.11
S.D.	10.43		11.51
$S.E._M$	1.43		1.58
$M_E - M_C$		6.48	
S.E. Diff.		2.15	
t		3.01	
P		<.01	
SPELLING: Mean Score	15.09		12.94
S.D.	5.14		5.49
$S.E._M$	.71		.75
$M_E - M_C$		2.15	
S.E. Diff.		1.03	
t		2.09	
P		.05	

demonstrate superior performance to that of the Control group on each of the three measures, Reading Vocabulary, Reading Comprehension and Spelling.

SUMMARY

The results of statistical analyses of achievement test scores attained by Experimental and Control groups at each grade level — one, two and three — in Pasadena's Phonovisual pilot project strongly support the hypothesis that the Phonovisual materials and method of instruction have a salutary effect in the reading and spelling programs of the primary grades. All differences in mean performance between the two groups in each grade were in favor of the Experimental group and statistically significant.

Final Evaluation of the Phonovisual Method
Grades 1-3

Part II - An Investigation of Sex Differences in Test Performance

It will be recalled that sex was one of the variables taken into consideration when pupils of the Experimental and Control schools were paired or matched at each grade level for a study of end-of-year achievement test performance. In formulating the equivalent "grade level" samples with respect to scholastic ability and chronological age, equivalent groups of boys and equivalent groups of girls were drawn first. It was possible, therefore, to analyze further the achievement test data according to performance by each sex.

Grade 1

In Table VI, it will be seen that the first-grade mean performance of both sexes of the Experimental school exceeded that of their counterparts of the Control school in Reading Vocabulary and in Reading Comprehension. The difference between mean scores in each instance was statistically significant beyond the .01 level.

It may be noted that the girls' performance in each school tended to be superior to that of the boys in the same school — differences typically observed in achievement test surveys in the primary grades. It seems especially noteworthy, therefore, that the group of first-grade boys (Experimental) who had been instructed by the Phonovisual method attained mean scores in both Reading Vocabulary and Comprehension which exceeded the mean scores achieved by the girls in the Control group.

The relative success of boys and girls in the Experimental school and boys and girls in reaching their learning potential under control conditions, as determined by the Total Score of the Metropolitan

TABLE VI

Performance of Grade I Boys and Girls in Experimental and Control Groups on California Reading Tests

Grade 1	Boys		Girls	
	Experimental	Control	Experimental	Control
No. of children	30	30	30	30
Mean CA (months)	84.13	83.90	83.33	83.43
S.D. of CA's (months)	3.45	3.54	3.48	3.50
Mean Readiness Score	81.30	81.37	81.43	81.77
S.D. of Readiness Scores	10.63	10.63	7.35	6.97
VOCABULARY				
Mean Score	59.37	50.57	64.50	52.90
S.D.	11.84	12.70	7.12	10.14
$S.E._M$	2.20	2.36	1.32	1.89
$M_E - M_C$	8.80		11.60	
S.E. Diff.	2.24		2.00	
t	3.93		5.80	
P	<.01		<.01	
COMPREHENSION				
Mean Score	7.13	4.57	8.80	5.63
S.D.	4.23	3.55	4.05	4.20
$S.E._M$	.78	.66	.75	.78
$M_E - M_C$	2.56		3.17	
S.E. Diff.	.86		.92	
t	2.98		3.45	
P	<.01		<.01	

Readiness Tests, is presented in the bivariate charts of Tables VII, VIII, IX and X. The format of these charts is identical to Tables II and III and a detailed explanation or description, therefore, is not deemed necessary. In view of the general belief that the maturation of boys has not kept up with that of girls at the same grade level, it appears that the Phonovisual method of instruction may have significant compensatory value. The results suggest the possibility that there may be concomitant "feelings of competence" generated by the superior success in reading achieved by the first-grade children in the Experimental school which would permeate their attitudes toward future learnings.

Grade 2

Although the mean achievement of the boys of the second-grade Experimental group exceeded that of the Control-group boys, as shown in Table XI, the difference in performance on each measure was not of sufficient magnitude to reach the usual minimal criterion of statistical significance — the .05 level.

The differences between the higher mean performance of the Experimental-group girls and the mean performance of the Control-group girls on all three measures of achievement were very significant ($<.01$).

Again, as observed in the Grade 1 test results (Table VI), the performance of the girls in each school tended to be superior to that of the boys in the same school. The largest differences favoring the girls occurred in the Experimental school, even though the boys had a higher level of mental ability (see mean I.Q.'s in Table XI).

TABLE VII

Distribution of May Reading Vocabulary Levels
for Pupils in Each September Readiness Category

Experimental - Boys

Readiness Status in September of First Grade	Reading Vocabulary Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior							2	(25)	6	(75)	8
B High Normal			1	(9)	1	(9)	6	(55)	3	(27)	11
C Average	1	(11)	2	(22)	4	(44)	2	(22)			9
D Low Normal			1	(50)	1	(50)					2
E Poor Risk											
Total	1	(3)	4	(13)	6	(20)	10	(33)	9	(30)	30

Control - Boys

Readiness Status in September of First Grade	Reading Vocabulary Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior					4	(50)	3	(38)	1	(12)	8
B High Normal	2	(17)	2	(17)	2	(17)	4	(33)	2	(17)	12
C Average	2	(25)	3	(38)	2	(25)	1	(12)			8
D Low Normal	1	(50)	1	(50)							2
E Poor Risk											
Total	5	(17)	6	(20)	8	(27)	8	(27)	3	(10)	30

Note: The sum of the per cents in any row may exceed or may be less than 100 because of rounding in individual cells.

TABLE VIII

Distribution of May Reading Vocabulary Levels
for Pupils in Each September Readiness Category

Experimental - Girls

Readiness Status in September of First Grade	Reading Vocabulary Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior									5	(100)	5
B High Normal							4	(33)	8	(67)	12
C Average					5	(38)	5	(38)	3	(23)	13
D Low Normal											
E Poor Risk											
Total					5	(17)	9	(30)	16	(53)	30

Control - Girls

Readiness Status in September of First Grade	Reading Vocabulary Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior			1	(17)			2	(33)	3	(50)	6
B High Normal	1	(7)	1	(7)	7	(50)	3	(21)	2	(14)	14
C Average	2	(20)	3	(30)	3	(30)	2	(20)			10
D Low Normal											
D Poor Risk											
Total	3	(10)	5	(17)	10	(33)	7	(23)	5	(17)	30

Note: The sum of the per cents in any row may exceed or may be less than 100 because of rounding in individual cells.

TABLE IX

Distribution of May Reading Comprehension Level for Pupils in Each September Readiness Categ

Experimental - Boys

Readiness Status in September of First Grade	Reading Comprehension Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior					2	(25)	1	(12)	5	(63)	8
B High Normal			2	(18)	3	(27)	3	(27)	3	(27)	11
C Average			5	(56)	4	(44)					9
D Low Normal	1	(50)	1	(50)							2
E Poor Risk											
Total	1	(3)	8	(27)	9	(30)	4	(13)	8	(27)	30

Control - Boys

Readiness Status in September of First Grade	Reading Comprehension Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior			6	(75)					2	(25)	8
B High Normal	1	(8)	4	(33)	5	(42)			2	(17)	12
C Average	2	(25)	6	(75)							8
D Low Normal	1	(50)	1	(50)							2
E Poor Risk											
Total	4	(13)	17	(57)	5	(17)			4	(13)	30

Note: The sum of the per cents in any row may exceed or may be less than 100 because of rounding in individual cells.

TABLE X

Distribution of May Reading Comprehension Levels
for Pupils in Each September Readiness Category

Experimental - Girls

Readiness Status in September of First Grade	Reading Comprehension Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior									5	(100)	5
B High Normal			1	(8)	1	(8)	3	(25)	7	(58)	12
C Average	1	(8)	3	(23)	4	(31)	3	(23)	2	(15)	13
D Low Normal											
E Poor Risk											
Total	1	(3)	4	(13)	5	(17)	6	(20)	14	(47)	30

Control - Girls

Readiness Status in September of First Grade	Reading Comprehension Level in May of First Grade										Total
	E		D		C		B		A		
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)	
A Superior	1	(17)	1	(17)			1	(17)	3	(50)	6
B High Normal			5	(36)	6	(43)	2	(14)	1	(7)	14
C Average	3	(30)	4	(40)	1	(10)	1	(10)	1	(10)	10
D Low Normal											
E Poor Risk											
Total	4	(13)	10	(33)	7	(23)	4	(13)	5	(17)	30

Note: The sum of the per cents in any row may exceed or may be less than 100 because of rounding in individual cells.

TABLE XI

Performance of Grade II Boys and Girls in Experimental and Control Groups on the California Reading and Spelling Tests

Grade 2	Boys		Girls	
	Experimental	Control	Experimental	Control
No. of children	34	34	34	34
Mean CA (months)	95.21	95.41	95.18	95.03
S.D. of CA's (months)	3.30	2.88	3.20	3.00
Mean IQ	111.65	111.59	106.59	106.62
S.D. of IQ's	7.79	7.68	8.04	7.39
VOCABULARY: Mean Score	35.44	33.50	38.62	34.15
S.D.	7.25	6.10	4.47	6.61
$S.E._M$	1.26	1.06	.78	1.15
$M_E - M_C$	1.94		4.47	
S.E. Diff.	1.58		1.32	
t	1.23		3.39	
P	NS		<.01	
COMPREHENSION: Mean Score	33.85	31.32	38.44	31.97
S.D.	10.50	10.14	6.81	10.18
$S.E._M$	1.83	1.76	1.18	1.77
$M_E - M_C$	2.53		6.47	
S.E. Diff.	2.48		2.00	
t	1.02		3.24	
P	NS		<.01	
SPELLING: Mean Score	12.82	11.82	14.79	11.74
S.D.	4.79	3.81	4.40	2.95
$S.E._M$	.83	.66	.77	.51
$M_E - M_C$	1.00		3.05	
S.E. Diff.	1.01		.97	
t	.99		3.14	
P	NS		<.01	

Grade 3

Since the sub-samples (boys and girls) of the third-grade Experimental and Control schools were of considerably less size (N=27) than the "grade level" samples, the reliability of the obtained difference in each instance was necessarily less (the standard error was larger). The obtained difference was therefore required to be of greater magnitude to be "statistically significant." For example, a difference of 4.86 raw score points in Reading Comprehension is observed in Table XII between the mean scores of the Girls — Experimental and Control groups. This difference of approximately 5 raw score points was not statistically significant (NS) when the t-test was applied because of the relative size of the standard error of the difference. It will be recalled that a very significant difference ($<.01$) was obtained when the mean performances of the entire Experimental and Control groups (both sexes) were compared in Table V.

All differences between mean scores submitted to the t-test for significance and reported in Table XII favor the children of the Experimental school.

An interesting and noteworthy phenomenon may be observed with respect to reading performance of third-grade boys versus reading performance of third-grade girls. It will be seen that on all three measures the mean scores of the girls in the Control group exceeded those of the Control-group boys — a familiar difference in tested achievement. However, in the case of the performance of the third-grade Experimental-group boys, they not only showed superior reading ability when compared with the boys in the Control school, but also tended to exceed the reading performance of the third-grade girls!

Many studies of children with reading difficulties have shown that boys significantly outnumber girls in attendance at remedial reading clinics — as much as 2 to 1. Data of the Pasadena Pilot project suggest the possibility that the Phonovisual method of instruction can make a very valuable contribution toward reducing the number of children requiring remedial reading instruction.

TABLE XII

Performance of Grade III Boys and Girls in Experimental and Control Groups on the California Reading and Spelling Tests

Grade 3	Boys		Girls	
	Experimental	Control	Experimental	Control
No. of children	27	27	27	27
Mean CA (months)	108.85	108.93	107.37	107.29
S.D. of CA's (months)	3.84	3.92	2.42	3.15
Mean IQ	112.11	112.22	111.59	111.59
S.D. of IQ's	8.74	8.58	10.81	10.74
VOCABULARY: Mean Score	34.89	27.19	32.90	29.78
S.D.	5.59	8.45	5.09	7.55
$S.E._M$	1.10	1.66	1.00	1.48
$M_E - M_C$	7.70		3.12	
S.E. Diff.	2.12		1.39	
t	3.63		2.24	
P	<.01		<.05	
COMPREHENSION: Mean Score	41.00	32.89	40.19	35.33
S.D.	11.81	11.68	8.76	11.20
$S.E._M$	2.32	2.29	1.72	2.20
$M_E - M_C$	8.11		4.86	
S.E. Diff.	3.29		2.81	
t	2.47		1.73	
P	<.05		NS	
SPELLING: Mean Score	14.22	11.19	15.96	14.70
S.D.	5.31	3.62	4.80	6.38
$S.E._M$	1.04	.71	.94	1.25
$M_E - M_C$	3.03		1.26	
S.E. Diff.	1.36		1.48	
t	2.23		.85	
P	<.05		NS	

GENERAL SUMMARY

The purpose of this study was to compare the achievement test performance of two groups of children in grades one, two and three, respectively — matched with respect to sex, chronological age and scholastic ability — of which only one group at each grade level received reading instruction by the Phonovisual method. Differences observed between the mean scores of groups at each grade level (and also for each sex within the respective groups) on achievement tests in reading vocabulary, reading comprehension, and spelling were analyzed for statistical significance.

Correlational analyses were made also between the scores obtained in September by the first-grade children on a measure of learning readiness (or potential) and end-of-year reading test scores.

Analyses of the statistical results support the hypothesis that the Phonovisual materials and method of instruction are effective in the teaching of reading and spelling in the primary grades. In each analysis of test performance by the equivalent groups, children in the Experimental school showed superior performance to their counterparts in the Control school.

The correlational analyses revealed that first-grade boys and girls taught by the Phonovisual method demonstrated relatively greater success in reaching their learning potential than did the children under control conditions.

Analyses of the data suggest also that the Phonovisual method can be of valuable assistance in the reduction of the number of children requiring remedial reading instruction. Boys — whose reading performance is generally below that of girls at the same grade level and who are found in greater numbers at remedial reading clinics — appear to be aided substantially in achieving higher levels of proficiency in reading skills when the Phonovisual method of instruction is used.